FLOWERING ANNUALS FOR SUN AND SHADE

University of Illinois
College of Agriculture
Cooperative Extension Service
Circular 930

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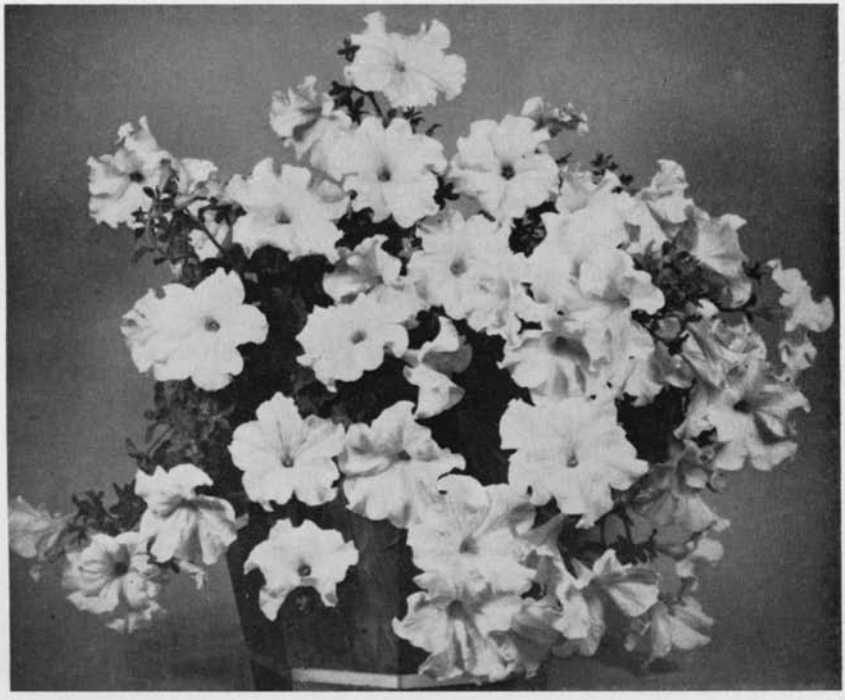
THE HOME GARDENER who uses taste and imagination when he plans his landscaping will find the versatile flowering annuals colorful and vigorous additions to any flower bed.

This versatility of the flowering annuals makes them useful in most flower gardens — they grow in a wide range of colors and sizes and do well in both sun and shade.

The home gardener who takes advantage of these factors can use flowering annuals to present an attractive landscaping picture that will bloom from spring to fall in any area of the yard.

This publication will help you use flowering annuals in a variety of colors, flower forms, plant heights, and foliage textures. You will learn to use them in flower beds or flower borders, among perennials and biennials, or planted in window boxes, hanging baskets, tubs, urns, or outdoor planters.

Remember that a successful flower garden does not develop by itself. You need to prepare the soil so it will be highly fertile. Do a



This arrangement of petunias in a redwood box is often used on porches and patios. Pots, urns, and vases can also be used to hold flowers outdoors.

good job of selecting varieties. Fertilize your flowers and control weeds in them. Plant flowers properly and care for growing plants.

Selection of Plant Varieties

Most annual flowers will do well in all parts of the state, but be certain to buy varieties that have done well in your area in previous years.

Your local greenhouse or garden center manager can tell you what varieties to buy. He will have many proven varieties for sale. The gardening experts there may also suggest some new hybrid varieties that they believe will do well in your area.

Plant breeders in recent years have done research that has produced new varieties of the standard annual flowers. These new varieties generally perform better than the old ones. Most of them are F_1 hybrids and are identified as such in catalogs and on seed packages or plant containers. These new hybrids are usually more vigorous and uniform in color, size, and habit of growth than the standard varieties, and the numbers and sizes of the flowers very often have been increased.

Petunias, ageratums, marigolds, zinnias, and snapdragons are just a few of the genera that are now offered as new hybrid annuals. The vigor of these hybrids is impressive, because they begin flowering shortly after planting and continue flowering throughout the growing season.

If you want to see various varieties of annuals, visit floricultural demonstration plots located in Illinois. If you live in a large city, call your city park district and ask the location of flower beds containing annuals. The University of Illinois maintains a large demonstration garden at its Urbana campus. Be certain to save the seed packages from annuals, so you can buy your favorite varieties again the next year.

Starting With Seed

Growing annual flowers from seed is an interesting gardening project if you have a good location for starting plants.

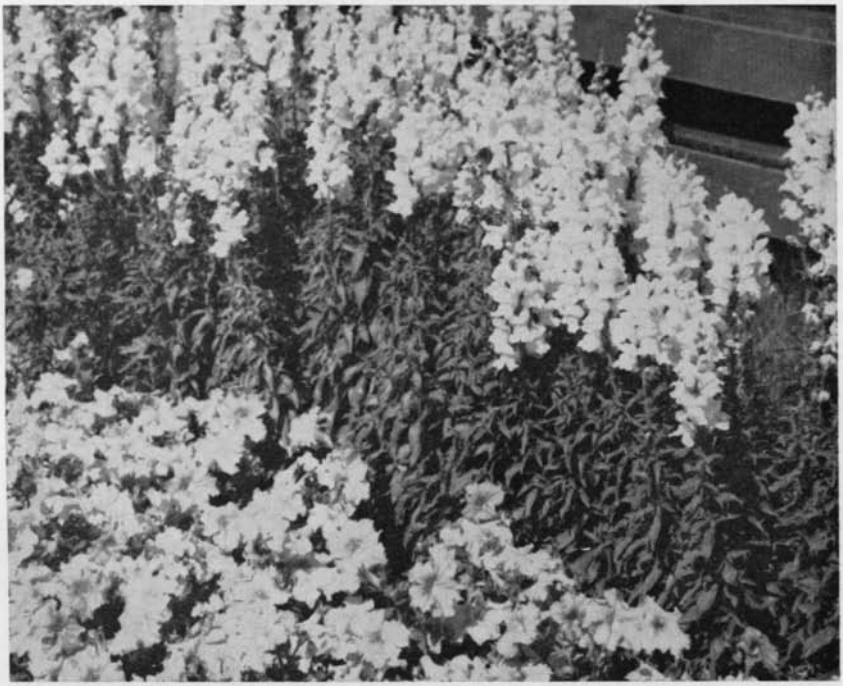
It is best to use hotbeds, cold frames, or small greenhouses if possible. You can use fluorescent lights for seed germination, but be sure the light intensity is high enough so the seedlings develop normally until you are ready to plant them out. Be certain the temperatures maintained under the lights are favorable for each variety.

The timing of annuals germinated indoors is sometimes very diffi-

cult for home gardeners. You will face a serious problem if you have plants ready to be set out a few weeks or a month too early. In general, sow seed indoors 4 to 8 weeks before the planting-out date. Sow the seed of slow-growing flowers early and fast-growing flowers late.

Some home gardeners try to save seed from their annuals. It is best not to do this unless the seed produces plants similar to the parents or "comes true." Saving seed from F_1 hybrids often results in inferior plants that do not resemble the parents in color, size, or habit of growth. The growing season in the midwest is not always favorable for seed production and you may collect poor seed that does not germinate well. Storing seed under home conditions does not always work well. So it is usually best to buy new seed each spring, rather than use seed gathered in your garden or purchased the previous year. Buy only the amount of seed you will need for the current year.

More information on germinating seed is included in Circular 793, "Soil Sterilization Methods for the Indoor Gardener," and Circular 796, "Germinating Flower Seeds." These publications are available at



This is a typical border display of new hybrid varieties of snapdragons and petunias. The new hybrids are often quite vigorous and colorful.

the county extension offices or from the Information Office, College of Agriculture, Urbana.

Selecting varieties is becoming more of a problem because fewer seed companies are retailing seed packets to home gardeners. Whether you buy your seed from a garden center, greenhouse, or flower shop, or through a mail order catalog, be certain to make your purchases early. The advertised varieties are usually the first to be sold out and you may be disappointed if you have to settle for substitutes. The purchase of good varieties of seed is also becoming difficult because the price of hybrid seed for many of the new varieties may limit its sale only to professional greenhouse operators. For these reasons you probably will be money ahead if you buy started plants rather than seed.

Buying Started Plants

The home gardener will find many advantages to buying started plants. When you buy started plants they are generally in the flowering stage of their development, but it is more important to get healthy, well-branched plants than ones with blooms on them. They are easy to transplant and bloom quickly. This means you will have flowers from the frost-free time in the spring until at least the first killing frost in the fall. If you plant seeds in your garden you will have no flowers for several weeks. Of course, you eliminate the germination problem by setting out started plants. Using started plants also helps you control the number and spacing of the plants in your garden.

Drainage and Aeration

You must improve the drainage and aeration of most Illinois soils to do a top job of growing annual flowers. Many home gardeners plant extensive flower beds, but have disappointing results because they did not prepare the soil before planting.

Apply materials such as sphagnum peat moss, leaf mold, compost, and rotted manure in early spring and spade or fork it into the soil before planting. Application rates will vary with the type of soil you have and its previous use, but in general you can work 2 to 4 inches of organic matter into the top 6 to 8 inches of the planting area and get satisfactory results. Apply this material several weeks before planting annuals in areas that have been used for flower gardening in previous years. If you are planting in an area that has not previously been used for flower gardening, work organic matter into the soil during the fall preceding your plantings.

Give special attention to the preparation of outdoor seedbeds. Be certain the bed is level and rake the area smooth after the final spading. Remove all rocks, stones, clods, old stems, straw, and so forth.

If you grow annuals in partial shade — areas on which the sun shines for as little as an hour each day — they will need very well-drained soil. Plan to have at least 25 to 35 percent organic matter in the soil in such areas. Remove the top 6 to 8 inches of soil from the area, mix it with sphagnum peat moss or other organic matter, and return it to the bed. If the area is poorly drained, you may have to dig 18 to 24 inches deep when removing the soil so you can put 3 to 4 inches of gravel or cinders in the bottom. Remember that all annuals require good drainage and you may have to raise the soil beds to improve drainage.

Change the soil in tubs, window boxes, urns, and other small plant holders each year. Use a mixture containing one-third garden loam, one-third sphagnum peat moss, and one-third vermiculite or perlite to form a potting mixture. This mixture will not perform best unless there is drainage in the bottom of the container. Place materials such as crushed rock, crushed flower pots, or gravel in the bottom 2 inches of the container, especially if there are no drainage holes to permit the rapid runoff of excess water.

Weed Control

Another important consideration in soil preparation is the control of weeds, especially perennial weeds. Perennial weeds grow from root stocks already in the soil and usually cannot be controlled effectively by hoeing or spading. You can easily control common perennial weeds such as quack grass, Canada thistles, and dandelions when you use herbicides. Do not use fertilizer-herbicide mixtures. Herbicides remain active in the soil for several weeks and the residues can injure growing flowers. All herbicide activity must stop before flowers are planted. The operator of your local garden center will tell you what herbicides perform best in your area and for your purposes. Recommendations on herbicide containers will indicate how much herbicide to apply and when you apply it. Shallow hoeing and mulching will help you control most ordinary annual weeds.

Fertilizers

Be certain to work some fertilizer into the soil when you are spading in the organic matter. Use a complete fertilizer, such as 5-10-5, 10-6-4, or 10-10-10 and apply at the rate of 1 to 2 pounds per 100

These flowers are a good example of effective use of fertilizer and herbicides. With good fertilization foliage will grow to the base of the plant.

square feet of flower bed area. If you use a fertilizer with a high content analysis (such as 10-10-10), then apply it at the 1-pound rate. Apply lower analysis fertilizers at higher rates. Follow application recommendations listed on the fertilizer container.

You will have to apply lime or agricultural limestone if your soil has an acid reaction. There are many areas in Illinois where lime is not needed, so check with your county farm adviser to see if you need to have your soil tested. Soil tests take time, so have them done well in advance of the planting season.

If the fertility level of your soil is low, you may need to make applications of dry or liquid fertilizers at regular intervals through the growing season. A good program is to apply ½ to 1 pound of 5-10-5, 10-6-4, or 10-10-10 per 100 square feet every month to six weeks, as indicated by plant development.

You can use either liquid or dry fertilizers. If you use liquid fertilizers, be certain not to make concentrated applications. Check to make certain your equipment is working correctly. Excessive use of nitrogen can cause lush growth of stems and foliage with little development in the flowers.

When you fertilize be sure the soil is moist before you apply any material. Water the beds, apply the fertilizer, then water again. Do not let dry or concentrated liquid fertilizer fall on the foliage or flowers of the plants. If any does fall on the foliage or flowers, wash it off immediately because plant tissue burns may be caused. Plants growing in partial shade may require less fertilizer than those in full sunlight. Use inorganic fertilizers low in nitrogen or use organic fertilizers on shaded flowers. These plants are succulent and have very shallow, fibrous root systems that can be burned by an overdose of fertilizers. Observe your plants as they grow, because varying environmental conditions will change their fertilizer needs. Fertilize and water plants that become yellow or stunted. If plants have lush foliage and few flowers, they may be getting too much fertilizer.

Planting Dates

When the danger of frost is past and the planting area is thoroughly prepared, you can begin planting. In general, it is fairly safe to set out plants in the southern part of the state on May 1, in the central part on May 15, and in the northern part from May 20 to 30. This does not mean you should plant everything on these dates, but it indicates there are generally no severe frosts after these dates.

You can sow the seed of some annuals outside in early spring, but check the seed package for specific recommendations. Remember seeds germinate best when the soil temperatures are above 60°. Warm soils also aid root growth. You will not necessarily get early flowers from early planting, because soil temperatures may be too low.

Tips on Planting

More failures in growing annuals result from improper planting than from any other cultural factor. If you are planting seeds, be certain that the depression in which the seeds are to be planted is well defined and at the depth recommended on the seed package. Place approximately ½ inch of vermiculite on larger seeds, ¼ inch for medium size seed, and a trace of vermiculite on smaller seeds, rather than

Started plants, such as these marigolds, are often sold in peat pots. When they are planted they can be left in the pots.

covering them with soil. You can improve germination by covering the seedbed with a newspaper, cheesecloth, or some similar material. This will keep the surface of the seedbed from drying out rapidly. It also will prevent erosion and discourage children and animals from disturbing the area until germination is completed and the seedlings are established. Keep plants moist until after germination. When the seedlings emerge remove the covering.

If you are planting started plants, be certain not to set them too deeply into the outside bed. Planting too deeply often causes poor root growth and stunted, poorly developed plants. Set the plants only slightly deeper than they were set in the container in which you bought them. If the plants are in pots or wood bands, remove the container at planting time and set them so the top of the soil ball is about ½ inch below the surface of the bed. You do not need to take plants out of fiber or peat pots, but remove the portion of the pot above the surface of the soil ball. This is a safeguard against overwatering, because the top section of these pots can trap excess water. You can also remove the bottoms of fiber or peat pots to improve water drainage and rooting.

Few home gardeners leave enough space between plants. Plan to leave 10 to 12 inches between most low-growing annuals. Leave 18 to 24 inches between tall annuals. If you leave space in which your plants can grow, you'll get much better results. A good rule of thumb

is to leave a space between plants that will be approximately one-half of their anticipated height.

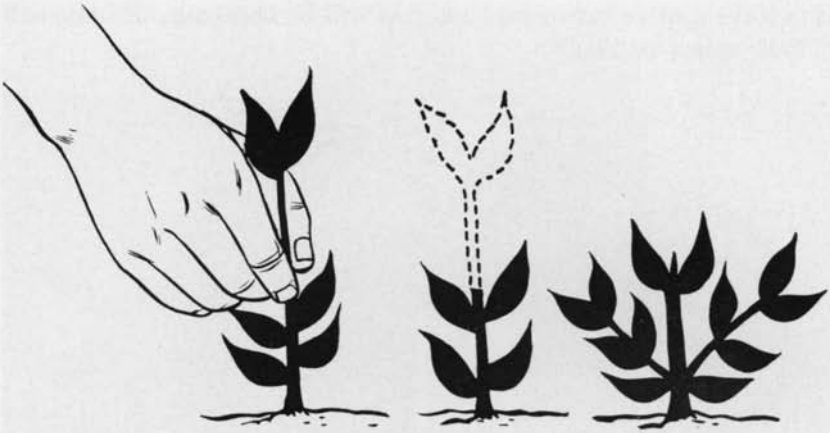
The zinnias shown here are ready for sale in a unit package. They must be removed from the package and planted with the proper spacing.

Thinning Seedlings

You will enjoy seeing a vigorous stand of young seedlings, but if you don't thin them out early in the growing season you will have disappointing results. Make your first thinning when the seedlings are beginning to form true leaves. In your first thinning, remove enough seedlings so that you have approximately twice as many plants left as you want to grow to full maturity. Make the second thinning when the plants are 3 to 4 inches tall. If delayed too long, the second thinning will disturb the root systems of the remaining plants. If you leave too many plants, your flower bed will produce plants that have poor-quality foliage and flowers.

Pinching

Most of the common annuals respond well to a horticultural practice known as "pinching." To "pinch" a plant you remove the



Pinching increases the number of branches on a plant so it produces more flowers. Break or cut off the tip of the plant. Leave at least 3 or 4 leaves.

top inch or two from its growing tip to encourage branching. If you pinch your plants they will produce many more flowers during the growing season. Started plants may already have been pinched by the greenhouse grower. Look for cut areas on the uppermost portion of the stems to see if a plant has been pinched. Do not pinch celosia, balsam, or poppy. When you pinch flowers, you sacrifice the first bloom so that you will have more flowering branches through the growing season.

Mulching and Cultivating

Mulching flower beds, rather than cultivating them, is not a new practice, but it recently has gained popularity. You can mulch your flower beds, but care must be taken to do a good job. Mulching will help to conserve moisture, reduce the annual weed population, reduce cultivation time, preserve the soil aeration and drainage, and improve the looks of the finished planting bed.

You can use several materials for mulching. Some of the more popular ones are sphagnum peat moss, ground or crushed corncobs, cocoa bean hulls, pine needles, compost, wood chips, partially decomposed sawdust, granite chips, black plastic covered with gravel, peanut hulls, shredded bark, and pecan shells.

Be certain the soil is moist and its temperature is 60° before you put the mulch down. Make the mulch 2 to 3 inches deep and keep it at that depth through the growing season. Do not mulch until one

Pine needles were used to mulch these ageratums.

week after planting. This will give you time in which to replace plants that are not doing well. If you use an organic material for mulching, incorporate it into the soil at the end of the growing season. This will improve drainage and aeration of the soil. Some of the organic mulches decompose rapidly during the growing season and deplete the soil's nitrogen supply if additional fertilizer is not added. Be sure to fertilize the flower beds so a supply of nitrogen will be available during the growing season. Use sphagnum peat moss to mulch plants that grow in partial shade. These plants have a shallow root system and need a regular water supply.

Watering

If you want to raise good annual flowers, you must do a good job of watering so the flowers will develop properly.

When you water, water thoroughly. Generally, a gardener using a hand-held hose and nozzle will not water a garden thoroughly because this method takes too much time and patience. Use a sprinkler to water your garden beds and make certain the water penetrates down to the root zone, which extends 7 to 10 inches below the surface. Don't water again until the soil begins to dry out.

There are many sprinklers that will help you do a good job. Let the sprinkler run long enough for the soil to be well soaked, but don't let large puddles of water collect. If the soil is poorly drained, run the sprinkler for short periods through the day so the water will have a chance to soak into the soil. Put a mulch on sloping flower beds so that watering will not cause erosion. Plants, flowers, foliage, and stems must be dry during the night if they are to resist diseases, so avoid watering in the late afternoon or early evening hours.

You can also use soaker hoses effectively. If you purchase enough of them to water several flower beds at once, you will save yourself a lot of time. When you use a soaker hose you lose little water to runoff and evaporation and have less soil compaction. Move the hoses periodically so there are no dry spots left in the bed.

Removing Faded Flowers

Many annuals flower throughout the growing season. Most of them will look and rebloom better if you remove the old flower heads every five to seven days. Marigold, zinnia, pansy, snapdragon, and cosmos respond especially well to this. Pruning long stems of petunia, ageratum, fibrous-rooted begonia, lantana, annual phlox, verbena, bells of Ireland, coleus, and pansy will keep these plants compact.

Insects and Diseases

The table on the following page lists many of the common flower insects. In most cases, home gardeners can control insects by following the recommendations in the table. More information on the identification and control of insects is available in Bulletin No. 237, "Controlling Insects on Flowers." This publication can be obtained for 40¢ from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C.

There is not enough space in this publication to discuss diseases of annual flowers. Information on diseases is available in Special Publication No. 3, "Diseases of Ornamental Plants." To obtain this 208-page publication write to the Information Office, College of Agriculture, Urbana, for the price.

Control of Insects on Annual Flowers

Insecticide[1]	Dosage	Suggestions
Ants, white grubs, soil-nesting wasps		
chlordane 45% E.C. dieldrin 18.6% E.C.	8 oz. per gal. water 6 oz. per gal. water	Spray over 1000 square feet of soil and water in thoroughly. Do not spray on plant foliage. Do not plant vegetable root crops on treated soil for 5 years.
Aphids, mealybugs, lacebugs, scales, white flies		
malathion 50-57% E.C.	2 tsp. per gal. water	Spray foliage thoroughly. Repeat treatments may be needed.
Blister beetles		
carbaryl 50% W.P.	2 tbl. per gal. water	Spray foliage. Repeat treatments may be needed.
Cutworms		
diazinon 25% E.C. diazinon 2% granules	6 oz. per 2-3 gal. water	Spray 1000 square feet soil at base of plants. Do not spray on plant foliage. For granules apply 5 pounds per 1000 square feet. Small numbers of plants can be protected with collars of paper, aluminum foil, or metal.
Grasshoppers		
carbaryl 50% W.P. malathion 50-57% E.C.	2 tbl. per gal. water 2 tsp. per gal. water	Spray foliage and also adjacent grassy or weedy areas.
Leaf-feeding beetles, caterpillars, plant bugs, leafhoppers, stalk borers, thrips		
carbaryl 50% W.P. DDT 25% E.C.	2 tbl. per gal. water 4 tsp. per gal. water	Spray foliage. Repeat treatments if needed.
Slugs		
Metaldehyde		Apply as a bait to soil. Remove old leaves, stalks, poles, boards, and other debris where slugs like to hide and lay eggs.
Sowbugs		
DDT 25% E.C. DDT 5% dust	1 oz. per gal. water	Spray or dust soil around plants. Remove boards and trash under which bugs hide.
Spider mites		
Aramite 15% W.P. chlorobenzilate 25% W.P.	1 tsp. per gal. water	Pay particular attention to underside of leaves when spraying. One treatment is effective for several weeks.
dicofol 18.5% E.C. malathion 50-57% E.C.	2 tsp. per gal. water	Pay particular attention to underside of leaves when spraying. Apply 2 or 3 times at weekly intervals.

[1] Do not use oil-base sprays on plants. Repeated use of DDT and carbaryl foliage sprays may cause mite or aphid infestations to increase and become damaging. Do not use insecticides during full bloom.

Note: E.C. = emulsion concentrate; W.P. = wettable powder.

Common Annuals for Illinois Gardens

Low Growing — 4 to 12 inches

- Ageratum
- Bachelor's Button (dwarf)
- Balsam
- Begonia (fibrous-rooted)
- Browallia
- Calendula
- Celosia (dwarf plumosa and cristata types)
- Dianthus
- Dusty Miller
- Gomphrena
- Impatiens (dwarf)
- Marigold (dwarf)
- Nasturtium
- Pansy
- Phlox
- Salvia (dwarf)
- Snapdragon (dwarf)
- Sweet Alyssum
- Torenia
- Verbena
- Vinca
- Zinnia (dwarf)

Medium Growing — 12 to 20 inches

- Balsam
- Basil
- Bells of Ireland
- Carnation
- Celosia
- Coleus
- Dahlia (dwarf)
- Dusty Miller
- Gomphrena
- Helichrysum
- Impatiens
- Kochia
- Petunia
- Rudbeckia
- Salvia
- Snapdragon (half dwarfs)
- Vinca
- Zinnia

Tall Growing — 20 to 60 inches

- Amaranthus
- Aster
- Bachelor's Button
- Celosia
- Cleome
- Cosmos
- Dahlia
- Hollyhock
- Marigold
- Scabiosa
- Snapdragon
- Tithonia
- Zinnia

For Partial Shade

- Ageratum
- Balsam
- Begonia (fibrous or tuberous rooted)
- Browallia
- Caladium
- Coleus
- Impatiens
- Lobelia
- Pansy
- Sweet Alyssum
- Torenia

For Cutting

- Aster
- Bachelor's Button
- Bells of Ireland
- Carnation
- Celosia
- Cosmos
- Dahlia
- Gaillardia
- Gomphrena
- Larkspur
- Marigold
- Nasturtium
- Petunia
- Rudbeckia
- Salvia
- Snapdragon
- Verbena
- Zinnia

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